

INFLUENCE OF Y SUBSTITUTION IN Gd₂-XYxFe₁₇ COMPOUNDS

ABSTRACT

Gd₂-xYxFe₁₇ (x = 0; 0.6; 1.0) compounds were prepared by standard arc melting method. Thereafter, samples were subjected to annealing for two days at T=1273 K, finishing with quenching to 273 K. The samples were cut into small portions to perform structural, electrical, and thermal characterization. Heat flow and Curie temperature (T_c) arise from measurements of thermal properties through Differential Scanning Calorimetry (DSC), structural properties were tested via X-ray diffraction (XRD) at T=273 K, electrical characterization was carried out through the Impedance Spectrometry (IS) method, upon zero applied magnetic field and temperature range between 300 K < T < 500 K. Results show that T_c decreases when Y concentration increases. T_c is obtained as the maximum temperature variation of heat flux. The Gd₂Fe₁₇ compound shows two endothermic heat flux peaks; this fact can be attributed to not identifying an impurity phase from X-ray diffraction measurements. From Rietveld refined data, the crystal structure for all compounds is established, resulting in a hexagonal Th₂Ni₁₇-type structure. Measurements of impedance spectrometry as function of frequency were analyzed in terms of equivalent circuit method, finding that for temperatures below T_c they fit according to the model composed of one RL and two RC parallel circuits, in contrast to temperatures above T_c given by the model that consists of only two RC parallel circuits.